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ABSTRACT

The purpose of the study was to test the discriminative cue hypothesis by attempting to train pupils to increase effort following a high expectancy condition and to reduce effort following a low expectancy condition. Fourth grade high-IQ low achievers were used as subjects in the study, because the authors felt that while they would learn fast, they would not be as likely as high-IQ high achievers to have previously learned responses to expectancy conditions. The results of the experiment support the hypothesis that children can learn to behave differentially to different adult expectancies when the expectancies are followed by consistently different outcomes; thus the "discriminative cue" function proposed for expectancy conditions is supported. The study provides a valuable model for an analysis of teacher behavior, implying that many kinds of teacher statements and non-verbal cues may potentially serve as discriminative cues for children. Used positively, such cues can increase responding and even bring about initial responses in new situations. (SES)

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The Cue Value of Adult Expectancy

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In a previous study (Gagné, E.; 1972) it was found that the effects of adult expectancy on pupil performance are moderated by the pupil's IQ and achievement levels and by the type of feedback being received. In a negative feedback situation, high-IQ high-achievers performed better under conditions of high adult expectancy than under conditions of low or no expectancy; low-IQ high achievers, on the other hand, performed better given a low adult expectancy. The latter result is surprising because it would not have been predicted from the self-fulfilling prophecy hypothesis (Rosenthal & Jacobson, 1966) which states that pupils perform to the level expected of them by their teachers.

To explain the results, a "discriminative cue" hypothesis was suggested. It was argued that high-IQ children in difficult (negative feedback) situations probably experience high expectancy and the high expectancy thus becomes a cue for increasing effort. Low IQ high-achievers, by contrast, probably experience low expectancy from adults when confronted with difficult tasks. Being achievement oriented, they increase their efforts despite the low expectancy and attain success following the low expectancy experience. Thus, for low-IQ high-achievers, a low expectancy is associated with success following effort and therefore becomes a cue for increasing performance.

The purpose of the study reported here was to test the discriminative cue hypothesis by attempting to train pupils to increase effort following a high expectancy condition and to reduce effort following a low expectancy condition. High-IQ low-achievers were used as Ss because it was felt that

while they would learn fast, they would not be as likely as high-IQ high-achievers to have previously learned responses to expectancy conditions. It was hypothesized that Ss who receive positive feedback when they increase their performance level following high expectancy conditions and negative feedback irrespective of performance following low expectancy conditons would begin to perform differentaly under high and low expectancy conditions, while Ss who receive positive and negative feedback uncorrelated with expectancy would show no such differential behavior. The question was also raised as to whether a differential response to expectancy conditions would transfer to a new task situation.

Method

Subjects

Twelve randomly selected high-IQ (110-130, California Test of Mental Maturity) low-achieving fourth-graders from a small town elementary school served as Ss. Low-achievers were pupils who performed at 1/2-1 1/2 standard deviations below what would have been predicted from their IQ (assuming an r= 1.00 between IQ and achievement) on the reading part of the Metropolitan Achievement Test. The reference group for establishing the means and standard deviations on these tests were all fourth graders at the elementary school used. After stratifying on sex, Ss were randomly assigned to Discrimination Learning (DL) or Control (C) groups.

Experimenters

One male and one female graduate student served as Es and Ss were randomly assigned to Es with the restriction that each E have three (DL) Ss and three (C) Ss.

Tasks

The training task involved looking at a card containing 16 familiar objects for 30 seconds and recalling all the objects that could be remembered after E removed the card. S performed on the task for six trials a day on seven consecutive school days. A set of 25 cards, roughly equivalent in difficulty, were used and every S saw the same card on the same trial.

The transfer task involved looking at a list of ten scrambled words (anagrams) and writing as many correct unscrambled words as possible within two minutes. The words were pretested for difficulty and each of the lists contained equal numbers of easy and difficult words. All Ss received the same list on the same trial.

Procedure

Es met individually with Ss at desks set up in the school corridors.

Baseline. On the first day, E greeted S and asked a few questions to establish rapport. E then explained the training task and S performed for one practice trial and five baseline trials on which no expectancy or feedback statements were administered. S's average performance over these five trials was used as a covariate in the analysis of the training data.

Following the training task trials, E explained the transfer task to S and S performed a practice trial. S then performed another trial and the number of words correctly unscrambled for this trial was used as a covariate in the analysis of the transfer data.

Training. For seven consecutive school days, Ss in both the Discrimination Learning and Control groups performed on six trials a day, receiving a High or Low Expectancy statement preceding each trial, and a Positive or Negative Feedback statement following each trial. The expectancy statements

were selected by E from the following:

High Expectancy (HE)

I bet you can do	really well better than most a good job		on this one this time

Low Expectancy

I don't think you'll do	well very well as well as most		on this one this time

Before giving a LE statement E looked at the card he was about to show S, frowned and shook his head to communicate the supposed difficulty of the card. Before giving a HE statement, E examined the card, smiled and nodded to communicate its supposed simplicity.

The feedback statements were selected by E from the following:

Positive Feedback (PF)

You did	better than most very well	on that one that time

Negative Feedback (NF)

You didn't do	as well as most very well	on that one that time

E smiled and used enthusiastic tones in administering PF, and used a serious tone and straight face in administering NF statements.

Discrimination Learning Ss always received NF following the trials on which a LE statement had been given. On trials following an HE statement they received feedback in accordance with their performance: if S recalled more objects than his baseline he received a PF statement, but if he recalled at or below his baseline level he received an NF statement.

A Control S was yoked to each Discrimination Learning S such that the Control S received the same number of PF statements per day as did his matched DL S. However, the trials on which C Ss received PF statements were half LE and half HE trials and were selected without consideration for S's actual performance. C Ss received PF statements in a predetermined HE-LE sequence with the restriction that about half the trials be HE and half LE. Thus, while DL and C Ss were equated for the number of PF statements received per day, DL Ss received PF statements contingent on their increasing effort following an HE statement while C Ss received PF statements uncorrelated with either expectancy or effort.

To avoid the problem of Ss who might fail to increase effort from the outset and thus never receive a PF statement, a prompt was used. If a DL S did not increase effort on two successive HE trials, on the next HE trial E said "Now this time try to remember just _____ more than you remembered last time". (The specific number used was the number necessary for the particular S to go above his baseline level). The yoked C S received the same prompt.

Transfer. Following training trials, Ss were given two transfer trials using the anagrams task. In counterbalanced order each S received a High Expectancy statement before one trial and a Low Expectancy statement before the other trial. No feedback was given between trials. The number of words correctly unscrambled was used to evaluate the transfer effects of expectancy statements.

Results

Training

A 2 x 2 x 7 repeated measures ANCOVA on the number of objects correctly recalled (using the baseline as the covariate) revealed a significant effect

of Expectancy ($F = 18.66$; $df = 1, 10$; $p < .01$): the High Expectancy mean was 6.90 while the Low Expectancy mean was only 6.29. The effect of Days was also significant ($F = 2.48$; $df = 6,60$; $p < .05$), and the Days means are shown in Table 1. While the means for Days 2,4, and 6 are all higher than the means for Days 1, 3, 5, and 7, a test of this contrast using Scheffe's method ($\alpha \leq .05$ experimentwise) was not significant.

The ANCOVA also revealed significant interactions of Training x Expectancy ($F = 5.95$,; $df = 1, 10$; $p < .05$), Days x Expectancy ($F = 3.89$; $df = 6, 60$; $p < .01$), and Training x Days x Expectancy ($F = 2.91$; $df = 6, 60$; $p < .05$). The means for the Training x Expectancy interaction are shown in Table 2. Scheffe's test revealed a significant difference in the performance of the Discrimination Learning group under High vs. Low Expectancy but no difference in the performance of the Control group as a function of Expectancy ($\alpha \leq .05$ experimentwise).

In further analysis of the Days x Expectancy and Training x Days x Expectancy interactions, the means for Days 1, 2, and 3 were combined to form a measure of performance early in training and the means for Days 4, 5, 6, and 7 formed a measure of performance late in training. Scheffe's method was used to test hypotheses concerning differences between High and Low Expectancy means as a function of type of training and time in training. While none of these differences reached significance ($\alpha \leq .05$ experimentwise), the pattern of differences (Tables 3 & 4) is what would be expected if discrimination learning is taking place. That is, a larger difference was found between High and Low Expectancy performance late in training than was found early in training (Table 3), and a larger difference was found for the DL group late in training than for the C group late in training (Table 4).

Transfer

A 2 x 2 ANCOVA of average number of words correctly scrambled following training (using baseline unscrambling as the covariate) revealed no significant differences at or above the .05 alpha level.

Interviews

Upon completion of the transfer test, Ss were asked what E had said before each trial and whether or not their performance had usually matched E's prediction. All Ss remembered both types of expectancy statements made by E. In the DL group, five of the six Ss said that their actual performance was usually in line with E's expectancy, while in the C group six of the six S said that their performance did not necessarily match E's expectancy.

Discussion

The results support the conclusion that children can learn to behave differentialy to different expectancies from adults when the expectancies are followed by consistently different outcomes. Thus the "discriminative cue" function proposed for expectancy conditions is supported and one interpretation of the high performance of low-IQ high-achieving students given high expectancy statements (Gagné, E.; 1972) may be this cue function. An alternative argument that, by chance, the Control Ss did not perceive the two different types of expectancy statements while the Discrimination Learning Ss did is not supported by the interview data. Rather, it appears that all Ss actually heard both types of statements. It can also be concluded from the interview data that most children can verbalize a relationship between an adult statement and the probability of success.

The cue value of an expectancy condition does not appear to transfer from one task to another under the training conditions used. Perhaps in the

present study the task itself became part of the discriminative cue complex. A child's response to an expectancy might become more general if training trials were conducted using a wide range of tasks and/or a wide range of people in conjunction with the expectancy. In a negative way, it is plausible that just this sort of "training" obtains in the natural environment of ghetto children--that is, a low expectancy is followed by negative feedback over a wide variety of circumstances so that a depressed level of responding becomes a general trait.

Perhaps the greatest significance of this study lies in the model it provides for an analysis of teacher behavior. There may be many kinds of teacher statements and also non-verbal cues which can potentially serve as discriminative cues for children. Used positively, such cues can increase responding or even bring about initial responses in new situations. Using this model, interesting questions about the optimal temporal relationship of cue and reinforcement, and about the generalizability of teacher cues may be raised. A particularly important question, from a practical standpoint, is how dysfunctional responses to cues may best be extinguished.

Of course other important questions regarding the role of teacher behavior in student motivation are not usefully analyzed in discrimination learning terms. For example, what variables determine the perceived magnitude of reinforcement value of a teacher's verbal statement? Also, the whole area of the emotional impact of teacher's cues needs to be explored. The experiment reported here used relatively mild disapproval in a generally supporting atmosphere. If the effects of severe disapproval are found to be categorically different, a description of the difference would form a distinct research domain.

References

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[1] Now at University of Wisconsin. The authors wish to thank the children, teachers, and administrators of Mifflinburg School District for their co-operation in the completion of this study.

Table 1

Mean Number Correctly Recalled Per Day

Day 1	2	3	4	5	6	7
6.11	6.75	6.55	6.74	6.50	7.15	6.36

Table 2

Mean Number Correctly Recalled as a Function of Type of Expectancy and Type of Training

Training	Expectancy		Difference
	High	Low	
Control	6.74	6.46	.28
Conditioned	7.07	6.11	.96*

* $p < .05$

Table 3

Mean Number Recalled as a Function of Type of Expectancy and Time in Training

Time	Expectancy		
Time	High	Low	Difference
Early	6.49	6.46	.03
Late	7.21	6.16	1.22

Table 4

Mean Number Correctly Recalled as a Function of Type of Expectancy, Type of Training, and Time in Training

Time	Training	Expectancy		Difference
		High	Low	
Early	Control	6.41	6.62	-.21
	Conditioned	6.57	6.33	.24
Late	Control	6.99	6.35	.64
	Conditioned	7.45	5.97	1.48